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10/573,462	03/24/2006	Takuya Kinoshita	NNA-241-B	2578
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YOUNG BASILE 3001 WEST BIG BEAVER ROAD SUITE 624 TROY, MI 48084			EXAMINER CULLEN, SEAN P	
			ART UNIT 1795	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/573,462	<b>Applicant(s)</b> KINOSHITA ET AL.	
	<b>Examiner</b> Sean P. Cullen	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>03/24/2006</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

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## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 4, “a doping concentration is set between 10<sup>17</sup>-10<sup>18</sup>” in line 4 is unclear. No units are given with this concentration. For examination purposes, the limitation will be “a doping concentration is set between 10<sup>17</sup>-10<sup>18</sup> cm<sup>-3</sup>” as seen in Fig. 8.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 6-9, 13, 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Horie et al. (U.S. 2001/0019794).

Regarding claim 1, Horie et al. discloses a bipolar battery cell (see cell group of a battery, abstract) comprising:

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- a plurality of bipolar electrodes (Fig. 4B), each including a collector (7) having a positive-electrode layer (2) on one surface and a negative-electrode layer (3) on another surface (Fig. 4B);
- a plurality of electrolyte layers (5) that exchange ions between the bipolar electrodes (see conductive ion layer, Fig. 4A-B); and
- a discharge circuit (1) that electrically conducts adjacent bipolar electrodes (2 and 3, Fig. 5A-B).

Regarding claim 2, Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- wherein the discharge circuit (1) is provided on the same surface of at least one layer of the positive-electrode layers (2), the negative-electrode layers (3), or the electrolyte layers (5, Fig. 1).

Regarding claim 6, Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- wherein the discharge circuit (1) includes a luminescent device (see luminescent element, Fig. 1).

Regarding claim 7, Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- further comprising a light guiding device (12) arranged between the luminescent device (11) and an end of the battery cell (Fig. 8).

Regarding claim 8, Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

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- further comprising a light sensor (4) that responds to light emitted from the relevant luminescent device (11, [0065]).

Regarding claim 9, Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- wherein the discharge circuit (1) includes a constant current circuit (20, Fig. 9A).

Regarding claim 13, Horie et al. discloses an assembled battery (Fig. 4B) comprising:

- a plurality of bipolar battery cells (Fig. 4B), wherein each bipolar battery cell comprises:
  - a plurality of laminated bipolar electrodes (Fig. 4B, [0048]), each including a collector (7) having a positive-electrode layer (2) on one surface and a negative-electrode layer (3) on another surface (Fig. 4A-B);
  - a plurality of electrolyte layers (5) that exchange ions between the bipolar electrodes (see conductive ion layer, Fig. 4A-B); and
  - a discharge circuit (1) that electrically conducts adjacent bipolar electrodes (2 and 3, Fig. 5A-B),
  - wherein the discharge circuit (1) is provided on the same surface of at least one layer of the positive-electrode layers (2), the negative-electrode layers (3), or the electrolyte layers (5, Fig. 1).

Regarding claim 15, Horie et al. discloses a method of forming a bipolar battery cell (see cell group of a battery, abstract) comprising:

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- laminating [0048] a plurality of bipolar electrodes (Fig. 4B), each including a collector (7) having a positive-electrode layer (2) on one surface and a negative-electrode layer (3) on another surface (Fig. 4B);
- laminating [0048] a plurality of electrolyte layers (5) that exchange ions between the bipolar electrodes (see conductive ion layer, Fig. 4A-B); and
- laminating [0048] a discharge circuit (1) that electrically conducts adjacent bipolar electrodes (2 and 3, Fig. 5A-B).

Regarding claim 16, Horie et al. discloses all claim limitations set forth above and further discloses a method:

- wherein the discharge circuit (1) is provided on the same surface of at least one layer of the positive-electrode layers (2), the negative-electrode layers (3), or the electrolyte layers (5, Fig. 1).

Regarding claim 17, Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell (see cell group of a battery, abstract) comprising:

- a plurality of bipolar electrodes (Fig. 4B), each including a collector (7) having a positive-electrode layer (2) on one surface and a negative-electrode layer (3) on another surface (Fig. 4B);
- a means for exchanging ions between the bipolar electrodes (5, see conductive ion layer, Fig. 4A-B); and
- a means for discharging the bipolar battery cell (1) by electrically conducting adjacent bipolar electrodes (2 and 3, Fig. 5A-B).

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5. Claims 1, 5, 11-12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Hisamitsu et al. (U.S. 2004/0038123).

Regarding claim 1, Hisamitsu et al. discloses a bipolar battery cell (see stack type battery, abstract) comprising:

- a plurality of bipolar electrodes (30), each including a collector (31) having a positive-electrode layer (32) on one surface and a negative-electrode layer (33) on another surface (Fig. 3);
- a plurality of electrolyte layers (40) that exchange ions between the bipolar electrodes [0079] and
- a discharge circuit (50) that electrically conducts adjacent bipolar electrodes [0121].

Regarding claim 5, Hisamitsu et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- wherein the discharge circuit (50) includes a zener diode layer (52).

Regarding claim 11, Hisamitsu et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- a sheathing material (45) that covers and seals the bipolar electrodes (30), the electrolyte layers (40), and the discharge circuit (50, [0050]).

Regarding claim 12, Hisamitsu et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- further comprising a conductive sealing material (45, see aluminum, stainless steel, nickel and copper, [0050]).

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Regarding claim 14, Hisamitsu et al. discloses a vehicle (801) comprising:

- a controller (see unit cell controller, [0147]); and
- an assembled bipolar battery (800) comprising a plurality of bipolar battery cells (see plurality of bipolar batteries, [0148]),
- wherein each bipolar battery cell (see stack type battery, abstract) comprises:
- a plurality of bipolar electrodes (30), each including a collector (31) having a positive-electrode layer (32) on one surface and a negative-electrode layer (33) on another surface (Fig. 3);
- a plurality of electrolyte layers (40) that exchange ions between the bipolar electrodes [0079] and
- a discharge circuit (50) that electrically conducts adjacent bipolar electrodes [0121],
- wherein the discharge circuit (50) is provided on the same surface (10-18, Fig. 3) of at least one layer of the positive-electrode layers (32), the negative-electrode layers (33), or the electrolyte layers.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



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7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Horie et al. (U.S. 2001/0019794) as applied to claim 9, in view of Hisamitsu et al. (U.S. 2004/0038123).

Regarding claim 10, Horie et al. discloses all claim limitations set forth above, but does not explicitly disclose a bipolar battery cell:

- further comprising a sheathing material that covers and seals the bipolar electrodes, the electrolyte layers, the discharge circuit, and the light sensor.

Hisamitsu et al. discloses a sheathing material (45) that covers and seals bipolar electrodes (30), electrolyte layers (40), and discharge circuit (50, [0050]) to prevent impact from

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the outside and an environmental degradation during use of the bipolar battery [0050]. Horie et al. and Hisamitsu et al. are analogous art because they are directed to stacked batteries with voltage-responsive devices. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make bipolar battery cell of Horie et al. with the sheathing material of Hisamitsu et al. to prevent impact from the outside and an environmental degradation during the use of the bipolar battery.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Horie et al. (U.S. 2001/0019794) as applied to claim 1 above.

Regarding claim 3, Horie et al. discloses all claim limitations set forth above, but does not explicitly disclose a bipolar battery cell:

- a contact area between the discharge circuit and the bipolar electrode that is more than  $0.06 \text{ mm}^2$  per battery capacity of the bipolar battery 1 Ah.

As the size of the opening for the discharge circuit and thickness of discharge circuit are variables that can be modified, among others, by adjusting the contact area between the discharge circuit and the bipolar electrode, with the opening for the discharge circuit increasing and the thickness of the discharge circuit decreasing as the contact area is increased, the contact area would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed contact area cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the contact area in the bipolar battery cell of Horie et al. to obtain the desired balance between the size of the

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opening of the discharge circuit and the thickness of the discharge circuit (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hisamitsu et al. (U.S. 2004/0038123) as applied to claim 1, in view of Einthoven et al. (U.S. 2003/0205775).

Regarding claim 4, Hisamitsu et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- wherein a threshold of a discharge voltage in the discharge circuit (50) is set between 3.6 V-4.1 V (see 4.0 V, [0124]), and

Hisamitsu et al. does not explicitly disclose:

- wherein a doping concentration is set between  $10^{17}$ - $10^{18}$   $\text{cm}^{-3}$ , and
- the thickness of a depletion layer is set between 0.1  $\mu\text{m}$ -1.0  $\mu\text{m}$  so as to set a breakdown voltage of a PN-junction of the discharge circuit the same as to the threshold.

Einthoven et al. discloses a voltage suppression device (abstract) with a doping concentration  $10^{17}$ - $10^{18}$   $\text{cm}^{-3}$  (see  $2 \times 10^{17}$ - $2 \times 10^{18}$   $\text{cm}^{-3}$ , [0051]) and the thickness of a depletion layer is set between 0.1  $\mu\text{m}$ -1.0  $\mu\text{m}$  (see 0.2  $\mu\text{m}$ , [0035]) to control the breakdown voltage of the device [0048]. Hisamitsu et al. and Einthoven et al. are analogous art because they are directed to voltage suppression devices (zener diodes). Therefore, it would have been obvious to one of

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ordinary skill in the art at the time of the invention to make bipolar battery cell of Hisamitsu et al. using the voltage suppression device of Einthoven to control the breakdown voltage.

### ***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean P. Cullen whose telephone number is 571-270-1251. The examiner can normally be reached on Monday thru Thursday 6:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on 571-272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. P. C./

Examiner, Art Unit 1795

/Basia Ridley/

Supervisory Patent Examiner, Art Unit 1795